## Remarks/Arguments

Pending in the application as amended in response to the Office Action identified as Paper No. 4 and dated 22 August 2002 are claims 1-4. Indication of any changes which have been made to the specification and claims are shown on the attachment entitled "Version with Markings to Show Changes Made".

## Specification

Applicant has taken this opportunity to provide clarifications to the specification which, as stated above, are noted hereinafter.

## Claim Rejections under 35 USC § 103

In paragraph 1 , the Office Action provides a quotation of 35 USC §103(a) setting forth the statutory basis for obviousness rejections. In paragraph 2, the Examiner advises of the need to affirm common ownership of the invention(s) at the time of their making. In paragraph 3, the Office Action states that claim 1 is rejected as being unpatentable over a U.S. Patent to Peterson in view of a U.S. Patent to Hunck.

Applicant takes this opportunity to affirm the Examiner's assumption that the subject matter of the present invention was commonly owned at the time of its making.

It is noted that the Office Action states a rejection of only claim 1, without explicit mention as to remaining claims 2-4; therefore, it is assumed that in the absence of any indication of allowability as to these claims that they are also rejected under the above combination. As stated above, the Office Action provides the combination of Peterson in view of Hunck as the basis for rejecting the claims. It is noted therein that Peterson provides transfer means, in the form of valves. With regard to Hunck, it is noted that it has been made part of the combination because ". . . it is well known in the art of fluid power systems with fluid motors arranged in series to move the control valves by pilot pressure from a solenoid controlled valve." It is further stated that "[s]ince the Peterson invention is a fluid power system with motors arranged in series, use of the solenoid operated pilot control valves would provide a means to move the spool in the control valve for the purpose of selectively directing fluid to the motors."

Applicant suggests that a prima facie case of obviousness has not been presented; specifically, due to the lack of a proper suggestion to combine the individual teachings of Peterson and Hunck. See MPEP § 2143.01. Peterson and Hunck each teach the elements noted by the Examiner. However, the suggested modification using the Hunck elements is not believed to be proper since those elements would only complicate -- needlessly -- the structure of Peterson. Further, the modification of Peterson, as stated by the Examiner, introduces structure which would appear to be necessary only from the perspective of hindsight, without regard to a permissible suggestion for that modification.

As can be seen in the claims, and as is consistent with the remainder of the specification, while at least one of the switching means is energized to allow flow through only its associated transfer means, the other of the switching means may remain de-energized to cause its associated transfer means to substantially prevent the flow of hydraulic fluid to its connected motor.

Accordingly, the switching means and transfer means act jointly to direct the flow of liquid to or away from a motor without interrupting the flow of fluid to or away from another of the motors. Specifically, such redirection substantially prevents the backflow of fluid into the service lines of the motor which is not made operational while the flow servicing the operational motor is moved toward the outlet. Further, this joint cooperation minimizes the opportunity for a loss in efficiency since the switching means and transfer means enable a substantially uninterrupted flow path which is free from unnecessary restriction.

Thus, in view of the above, it is believed that the combinations as provided in the claims, as they are now submitted, patentably distinguish over the references made of record and are in condition for allowance. Accordingly, such allowance is respectfully requested.

Any fees or charges due as a result of filing of the present paper may be charged against Deposit Account 04-0525. Two duplicates of this page are enclosed.

Two duplicates of this page are enclosed.

Respectfully,

Brian H. Buck

Brian H. Buck
Reg. No. 48,776
Patent Department
Deere & Company
One John Deere Place
Moline, IL 61265
Telephone No. (309) 765-4371

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, DC 20231, on 22 January 2003
Date

Deere & Company

Signature Date 22 January 2003

## "Version with Markings to Show Changes Made"

**In the Specification:**

1. Paragraph **[0002]**, at page 1, includes the following change(s):

It is known to provide a hydraulic circuit to conduct the flow of hydraulic fluid so as to allow a motor of a vehicle, such as a mower, to be operated. Typically, these circuits are provided with a series of valves and switches to direct the flow of that liquid [and] ,whereby pressure associated with that flow to that motor permits its device, a blade as in the case of a mowing tractor, to move.

2. Paragraph **[0004]**, at page 1, includes the following change(s):

With each of the above designs, disadvantages exist. In the case of providing a separate circuit for each of the separate motors, each circuit would require its own pump and control valve whereby the cost of doing so disfavors providing an economical product to the consumer. In the case of providing a circuit having each of the motors connected in series, efficiency, or the ratio of the work output to the work input across a system, is often decreased. This decreased efficiency results from drops in pressure across the valves which control the direction and function of flow and pressure through the circuit. These valves exist to regulate, as stated above, the pressure across the circuit [and are often made] when it is necessary to control the flow of hydraulic fluid to a first motor while preventing flow to one or more of a series of motors when it is desired to only operate one or a combination thereof. As fluid passes over these valves, the system experiences a drop in fluid pressure causing the system to be less efficient than it could otherwise be. Additionally, cost disadvantages also exist in this design due to the provision of these control valves.

3. Paragraph **[0018]**, at page 4, includes the following change(s):

The directional control valve 32, prior to the energizing of the solenoid valve 24, is closed, as is shown in Figure 1, and is opened as shown in Figure 2 by pressure from flow which has passed through the solenoid valve 24, as has been

previously stated. As shown in Figure 1, the directional valve 32 has four ports 38, 40, 42 and 44 therein whereby fluid can be passed through the port 38 to the port 44 whereby the ports 40 and 42 are closed to the motor 14. Referring to Figure 2, it is seen that upon pressurization by fluid traveling along a line 46 as a result of energizing the solenoid valve 24, the directional valve 32 and its ports 38 to 40 and 42 to 44 are opened so as to allow the main flow of fluid R1 supplying the front motor 12 to flow vertically upward therethrough and along a path R1,R2 through an exit port 48 which supplies and permits fluid to be passed through the left motor 14. After passing through the motor 14, the fluid re-enters the path R1,R2 through the port 50 where it then continues towards the outlet 22. Fluid which escapes the motor 14 and which does not flow along the path R1,R2 is routed to a drain port 52 which is combined with the drain flow of the directional valve 32 and is then returned to the tank 36. A similar directional flow can be conducted in a corresponding manner when it is desired that the right motor 16 be made operational.

4. Paragraph **[0021]**, at page 5, includes the following change(s):

Accordingly, the left and right motors 14 and 16 will be made operational as hydraulic fluid is then able to be delivered to them. As can be seen in Figure 3, actuation of both solenoid valves 24 and 55 associated with the left and right motors 14 and 16, respectively, establishes a flow path R1, R2, R3. The flow of hydraulic fluid exiting the left motor 14 may do so only in one direction which is directed towards the outlet 22. Consequently, flow is permitted to be directed only in a first entry and exit direction with respect to supplying the right motor 16; therefore, instances in which the flow R1,R2 (supplied to the right motor 16) [whereby that flow R1,R2 is allowed to] could re-enter the supply lines of the left motor 14, with a directional flow which is different than that which has been described above, are substantially prevented.

5. Paragraph **[0022]**, at page 5, includes the following change(s):

As also shown in Figures 1-3, flow patterns R1,R2 and R1,R2,R3 each include a relief such as the valve 60 therealong, which is provided to release excess fluid in the circuit when a sudden increase in pressure driving the flow thereof is

experienced. Such an increase in pressure may occur, as in the case of a rotating mower blade, when an object impacts the blade causing it to suddenly slow or stop [and] so as to [thereby] affect the work done by its respective motor. For example, the fluid pressure along R1, R2 may be higher at the port 48 than that at the port 50 when an object impacts the blade. Because the front motor 12 is operating upstream of the motor 14 in the series circuit and possesses inertia, or a tendency to move the fluid therein due to the rotation of its blade, obstructions affecting the left motor 14 will cause the inertia of the motor 12 to yield a sudden increase in pressure in R1, R2. As the flow R1, R2 is directed through the circuit, this pressure will be released through the relief valve 60 if it increases in an amount greater than that of the relief valve setting so as to bypass the obstructed motor 14 and preventing damage to its components. This component protection system can also be seen in the R1, R2, R3 flow path. Where an obstruction affects the right motor 16, the fluid will resume traveling along the designated pattern R1,R2,R3 towards the outlet 22, bypassing the right motor 16.

6. Paragraph **[0025]**, at page 7, includes the following change(s):

In the case in which it is desired to operate the front and left motors 64 and 66, flow will be directed to a logic control valve 80 and then along a path R4,R5 after a solenoid valve 82 has been energized by the operator having switched the control for the left motor 66 located on the vehicle operator's panel. The shifting of the solenoid valve 82 allows a pilot signal from R4, in the form of pressure, to shift the logic valve 74 to its closed position while connecting the pilot line 83 from the logic valve 80 to the tank 85 allowing it to open a flow path for R4 to the motor 66. Along this path, the flow R4,R5 will encounter a pilot check valve 84 used for [breaking] braking the motor upon shut down as well as a check valve 86 used to regulate flow only in the downward direction. Thereafter, the flow will continue to exit the system along the path designated R4,R5. With the flow just described being similar in nature for that required to obtain operation of the right motor 68, only the operation of and the flow designated R4,R5 servicing the left motor 66 has been described.

7. Paragraph **[0028]**, at page 8, includes the following change(s):

Thus, in contrast to the circuit 62 just described and shown in Figure 4, there is provided a hydraulic circuit 10 which connects each of three motors 12, 14 and 16 in series while eliminating restrictive valves within the operating flow path to allow for increased efficiency across the circuit 10. This increase in efficiency is permitted by eliminating valves such as the check valve 86. This increase is accomplished since the flows R1 and R1,R2 are routed into and out of their associated fluid transfer means, thereby achieving isolation of the left and/or right motor(s) so as to block flow not associated with either of [the] those motors from inadvertently re-entering it.

**In the claims:**

Amendment(s) to claims 1-2 is/are shown below.

I claim:

1. (amended) In a vehicle having an engine and including [a plurality of] at least a first and a second motor connected in series, [each transmitting motion to a respective device, and which are connected] the motors being connected to a pump for delivering a flow of hydraulic fluid [to at least a first motor in a series of motors] thereto, a circuit for controlling that flow of [the] hydraulic fluid to the [series of] motors so as to permit their simultaneous or individual operation, the circuit comprising:

a) an inlet through which fluid is supplied to the [first] motors [is passed];

b) an outlet through which the fluid may exit [so as to be available for return to the system];

c) a first and second switching means, each having a first and second position[, the fluid being restricted from flowing between the inlet and outlet when the switching means are in their first position and unrestricted therebetween when the switching means are in their second position];

d) a first fluid transfer means, having first and second positions, and which is associated with the first switching means for directing flow to or away from [a second] the first motor, the first transfer means having ports defining a flow path therethrough, the ports thereof being closed to flow therethrough when the first switching means is in its first position so as to [the second motor while allowing]

cause flow to bypass [through] the first [transfer means] motor [when the first switching means is in its first position] and be deliverable to the second motor, the ports thereof being open to the [second] first motor so as to allow flow thereto when the first switching means is in its second position [so as to permit flow to the second motor];

e) a second fluid transfer means, having first and second positions, and which is associated with the second switching means for directing flow to or away from [a third] the second motor, the second transfer means having ports defining a flow path therethrough, the ports thereof being closed to the [third] second motor when the second switching means is in its first position so as to direct such flow [while allowing flow to bypass through the second transfer means] to the outlet [when the second switching means is in its first position], the ports thereof being open and directing such flow between [to] the [and] second motor and the outlet when the second switching means is in its second position and the first switching means is in its first or second position. [so as to allow flow to the third motor; and

f) flow is directed between the inlet, the second motor and to the outlet when the first switching means is in its second position and the second switching means is in its first position, and flow is directed between the inlet, the third motor and to the outlet when the first switching means is in its first position and the second switching means is in its second position; and

g) the flows passable through the first and second transfer means being routed into and out of those respective transfer means when the first or second switching means is in the second position so as to not require a valve associated with the second and third motor to stop flow from passing through the other of the second or third motor while maintaining a flow path to the outlet.]

2. (amended) The invention of claim 1 wherein:

the flows which are passable through the first and second fluid transfer means, respectively, and which are routable into and out of those transfer means when the first and/or second switching means is in the second position, respectively, each include only one valve therealong which provides an open flow path to and from its respective motor to reduce loss in pressure across that flow path, thereby reducing loss in its efficiency while maintaining an ability to dissipate momentum of a device moved by the motor when that motor is no longer supplied by fluid passing

through its respective transfer means and preventing movement of flow into one of the [second and third] first and second motors when the other of the [second and third] first and second motors is operating.